

An Analysis of the Tooth to Tail Ratio in a Brigade Combat Team between 1990 to Present

A Monograph

by

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Abstract

An Analysis of the Tooth to Tail Ratio in a Brigade Combat Team between 1990 to Present by Major Peter J. Crandall, USA, 56 pages.

As the army organizes to fight the current Global War on Terrorism and other enemies in the 21st Century, logisticians will need the capabilities to keep pace with the high technology of the modern battlefield. Under the Army's Modularity campaign, the Army has redesigned the Army of Excellence and that of the Division XXI. The new name for this modular force is called the "current force" as the Army is still transforming to a "future Force." In modularity, the Army made key decisions to radically alter both the combat force from a division based army to a brigade based army and altered the way logistics will be conducted at the tactical level. Given personnel end strength constraints to Task Force Modularity force design development team, the modular force was designed to create a modular "brigade-based" Army that is more responsive to the regional combatant commanders' needs, better employs Joint capabilities, facilitates force packaging, rapid deployment, and fights as self contained units in non-linear, non-contiguous battlepaces. In support of the new design, the Army has attempted to reduce once again its proverbial "tail" in order to lessen the logistic footprint. Army planners therefore embarked on a new intellectual, organizational, and technological approach to tactical logistics at the brigade level.

This monograph examines the question: does the organizational change affecting the "tooth to tail" ratio sustain the flexibility and tactical mobility of the heavy brigade combat team? The monograph looked at the Army during Army of Excellence, Force XXI, and the Modular force to compare and contrast. The monograph briefly looks at the history of organization changes to the force, and then looks a little closer at the reasons why changes took place, followed by major changes that took place, then at the "tooth to tail" ratios through the changes and finally looks at the logistical structures and their impacts.

Finally, the monograph comes to a conclusion on the impacts of Modularity organizational changes affecting the flexibility and tactical mobility of the heavy brigade. The monograph shows that the benefits for the brigade are manifested in the form of increased asset visibility, greater anticipation of supply requirements, logistic tailorability, faster synchronization of logistic assets, increased response time, and enhanced command and control for logistical units. These advantages, despite the reduced back up support, make the heavy brigade flexible and increase the tactical mobility.

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Introduction

“It takes little skill or imagination to see where you would like your Army to be and when; it takes much knowledge and hard work to know where you can place your forces and whether you can maintain them there.”¹

Historically, the number of personnel and functions required to support warfare has continued to increase to the point where division level forces became so large they were too large to effectively move on the battlefield, as was discovered under the Division 86 organizational structure.² For some time, the force structure dilemma has been the trade off between assigning support capabilities to smaller self-sufficient units and the consolidation of support capabilities in larger units for more efficient utilization.

Additionally, there has been a general trend to increased numbers of support personnel in a direct support role. In 1942 General Leslie J. McNair called for the restriction of the number of non-combat troops and the pooling of all nonessential combat assets at higher headquarters. This led to a doctrinal debate over whether or not units should be "taskforced" or "type-forced." From this discussion, divisions were "type-forced" along functional lines, while higher echelons became "task-forced." Lower echelons, while initially "type-forced," slowly became "task-forced" as war developed.³ This task force development was a function of creating more self-sufficient units on the dispersed battlefield. The Pentomic division design was an attempt to create smaller self-sufficient combat units, larger than a battalion, but smaller than the regiment

¹ Martin Van Creveld, *Supply War: Logistics from Wallenstein to Patton*, (Cambridge: Cambridge University Press, 1977), 231-232.

² "The Army of Excellence-Final Report", (CACDA, Fort Leavenworth, KS, Volume III), 1-1

that would be a more flexible combat unit as well as a less lucrative target on the nuclear battlefield.⁴ Though the Pentomic division made theoretical sense for a nuclear environment, it was found to be too small to have sustaining power in either a nuclear or non-nuclear environment.⁵

Additionally there was a shift in defensive doctrine from massive retaliation to flexible response that caused a fundamental reorganization in the division. The new concept was the Reorganization Objective Army Divisions (ROAD). ROAD evolved from other reorganizational concepts such as the Modern Mobile Army (MOMAR) and the belief that the future nature of war would be more limited. The MOMAR division kept the Pentomic structure but was tailored to fit a heavy or medium mission. The heavy MOMAR division was the traditional heavy armor division and the medium MOMAR division was a mechanized infantry division. Most importantly the MOMAR pointed the way to organization for limited versus general war.⁶ ROAD centered on a division of three brigades with two to five maneuver battalions each. This design allowed the flexibility to employ a brigade in an independent role. This development was an evolutionary process reflecting the trend toward self-sufficient maneuver units and the required dispersion of unit.⁷ This evolutionary reorganization process continued with Division 86.

Division 86 was the approved organizational plan fielded with the October 1983, J-series Table Organization and Equipment (TOE). However, just prior to implementation the army leadership realized this force structure was un-supportable at current personnel authorization

³ John C. Brinley, "A History of US Army Force Structuring," *Military Review*, (February 1977), 67

⁴ Ibid, 78

⁵ A.J. Bacevich, "The Pentomic Era: The US Army Between Korea and Vietnam", (National Defense University Press, Washington, DC), 134-5

⁶ Ibid, 79

levels. Additionally, the large heavy division though well suited for new Air Land Battle doctrine that focused mid and high intensity forward deployed European conflict it was ill suited for limited low intensity and force projection environments. Therefore, the Chief of Staff of the Army (CSA) directed the TRADOC Commander to conduct a feasibility study for restructuring the Army. The TRADOC Commander directed the Combined Arms Center Commander, Fort Leavenworth to form an Army of Excellence (AOE) study group to determine approaches to reduce the manpower and resources within the army structure while maintaining or enhancing current combat capability to perform combat missions according to Air Land Battle doctrine.⁸ Additionally the AOE study group was to develop a new design for a footmobile light infantry division.⁹

What is important to note for the reader is that the Army's new division is not an end state in itself, but merely a pathway to the future. Conceptually, the Army knows where it wants to be tomorrow, but the question still looms whether or not it can sustain itself once it gets there. The adverse relationship between "tooth and tail", evident throughout Army history, is evident again today in the Army's quest for change.

The purpose of this monograph is to explore one fundamental question: does the organizational change affecting the "tooth to tail" ratio sustain the flexibility and tactical mobility of the heavy brigade combat team?

⁷ Ibid, 81

⁸ "The Army of Excellence-Final Report", (CACDA, Fort Leavenworth, KS, Volume III), 1-1

⁹ "The Army of Excellence-Final Report", (CACDA, Fort Leavenworth, KS, Volume II), 1-1

The question of flexibility and mobility has been objectives of force design planners over the years.¹⁰ The primary emphasis of division planners for years has been on flexibility and tactical mobility. Force design trends show a structure attempting to use mobility, flexibility and firepower to expand the size of the battlespace and tempo of operations.¹¹ Flexibility and tactical mobility for the purpose of this monograph will be defined as follows: flexibility is the ability of the maneuver brigade to adjust plans to changing situations, and tactical mobility is the ability to move combat power over space and time. The other definition for this monograph will be that of “tooth to tail”, which is the combat service support ratio to that of maneuver forces inside a division and/or brigade.

Chapter one begins with the reasons the Army is changing again, the main points of the AOE study. The chapter goes on to show the differences between the Division 86 and AOE Division, continuing to discuss the tooth to tail numbers. The chapter concludes with the new roles of the support battalion and the sustainability of the brigade. Chapter two and three then follows the basic concept as chapter one but looks at Force XXI and Modularity respectively. The monograph then concludes with comparing and contrasting the last three Army force development initiatives and a brief “way ahead”

Chapter One

The Army of Excellence (AOE)

¹⁰ US Army Command and General Staff College, CSI Report 14, “Sixty years of Reorganizing for Combat: A Historical Trend Analysis” (Combat Studies Institute, Fort Leavenworth, KS.: 2000, accessed 15 Oct 2006), available from <http://www-cgsc.army.mil/carl/resources/csi/reportno14/reportno14.asp>

¹¹ Ibid

The AOE study was guided by specific guidance and a methodology that led it to a greatly reduced manning level for a heavy division and the development of a light infantry division design. The CSA Guidance for the heavy division was "to reduce the total end strength of the division while maintaining the combat capability." Specific guidance included: (1) Retain ten maneuver battalions; (2) Consider the elimination or transfer of the Chaparral, 8-inch howitzers, MLRS, and aviation assets; (3) Retain the capability to adhere to Air-Land-Battle doctrine; (4) No specific end strength was provided as a constraint.¹²

As for the development of the light infantry division the CSA provided the following guidance: (1) The division will contain about 10,000 soldiers; (2) It will have nine maneuver battalions; (3) Deployable with 400-500 aircraft sorties; (4) One half of the division will be infantry.

In addition to the CSA's guidance the TRADOC Commander provided the following guidance to the heavy division portion of the study group: (1) Determine where personnel savings could be effected by reducing the inherent robustness and redundancy of the designs while maintaining the division's capability to conduct Air Land Battle; (2) Determine the feasibility of moving functions and weapons systems such as ADA, MI, 8 inch artillery, MLRS, target acquisition and aviation to corps; (3) Increase the tooth-to-tail ratio of the division; (4) Determine where concepts developed for the light infantry division are applicable to the heavy division design; (5) Maintain ten maneuver battalions in the division design.¹³

Guidance for the Light Infantry Design Group was as follows: (1) There are no "sacred cows." Every avenue toward minimizing personnel requirements and deployability profile would be explored; (2) Workload factors and allocation criteria would be reduced to the minimum

¹² "The Army of Excellence-Final Report", (CACDA, Fort Leavenworth, KS, Volume III), 1-1

essential for operations. Accepted Manpower Authorization Requirements Criteria (MARC) levels would not be binding if further savings could be made while maintaining acceptable combat power; (3) Selection of materiel for the Light Infantry Division would be based upon availability of the systems. Items with an initial operational capability (IOC) date of 1986 or earlier would be used; (4) The effort should be innovative in its approach; (5) Examine desirability and suitability of standardizing light forces; (6) Design lean and austere organizations that meet conceptual requirements in the most efficient manner possible providing only those assets and functions that would always be needed. All other occasionally required functions will be passed to corps; (7) Design the division to accept augmentation from corps as required by METT-T.¹⁴

TRADOC formally passed the AOE design assignment to the Combined Arms Center (CAC) on 30 August 1983. TRADOC urged the CAC force designers to develop a redesign that would exploit technology, thoroughly examine the heavy-light-SOF relationship, recognize the light forces' increasing role, and rigorously revise logistics planning factors. TRADOC gave the Logistics Center the responsibility, under CAC direction, for combat service support organizational revisions, as well as revision of logistics factors. Those factors included allocation rules, consumption rates of the classes of supply, workload, and other items. TRADOC additionally requested the Army Communications Command, the Intelligence and Security Command, and the Army Health Services Command to assist the planners.¹⁵

¹³ Ibid, 1-4

¹⁴ "The Army of Excellence-Final Report", (CACDA Fort Leavenworth, KS, Volume II), 1-4 & 1-5

¹⁵ Message, CDR TRADOC to CDRS USACAC and USALOGC, 301600Z Aug 83, SUBJ: Force Structure and Design Initiatives for an Army of Excellence. From Office of the Command Historian, TRADOC Fort Monroe, Virginia

Concept of the Army of Excellence (AOE)

The Army of Excellence (AOE) was an effort which started around 1983 culminating in the approved organizations of the Army of the 1980-90s, the Army with which the United States conducted combat operations in Panama in 1989-1990 (Operation Just Cause) and in the Persian Gulf in 1990-1991 (Operations Desert Shield and Desert Storm). No major institutional event evades controversy. The Army of Excellence was an Army built upon dilemmas rooted in the political and strategic currents of the early 1980s. Those omnipresent realities - a powerful and dangerous Soviet adversary, a global defense mission, an ongoing major cycle of weapon modernization, and an inflexibly capped Army end strength too small for the force needed - were factors forcing Army leaders to a compromise of balanced heavy and light organizational designs. These designs were unavoidably imperfect yet remarkably sufficient for the historically unprecedented strategic challenge and responsibility faced and borne by the United States in the world-changing decade of the 1980s.

Throughout the Cold War the US Army relied predominantly upon mechanized heavy forces to oppose the Soviet land threat of an army with the largest modern mechanized force in the world. That threat disappeared when the Soviet Union collapsed and subsequently military forces throughout the world significantly reduced their armed forces. The US Army from 1989 to 1999 underwent its most dramatic downsizing since the end of World War II. Since 1989 the nature of conflict changed, but U.S. Army force structure, although smaller, remained fundamentally a mechanized heavy force, with essentially the same heavy/light force ratio.

Sun-tzu in *The Art of War* stated that an army must know itself and the enemy, to ensure success in conflict.¹⁶ Likewise, U.S. Army doctrine stresses that in periods of rapid and fundamental change it is important to closely scrutinize previous assumptions made about the threat and factors impacting on the mission.¹⁷ During the Cold War the Army based its force structure on some key assumptions about the future threat and the global security environment. Those assumptions drove US Army force development and technological adaptations in accordance with the Concept Based Requirements System (CBRS).¹⁸ They allowed Army decision-makers to accept force design risks in some areas in order to seize on threat vulnerabilities in others.¹⁹ Though prudent at the time, many of those assumptions may no longer have relevance in an environment that no longer contains a Soviet Union or imminent conflict with a peer competitor.

The Heavy Division Structure in AOE

The armored and mechanized divisions' structures were essentially the same; they each had identical roles on the battlefield and nearly identical organizations. The mechanized infantry division in 1989 consisted of five M2, Bradley-equipped mechanized infantry battalions and four MI tank battalions.²⁰ Of the three maneuver brigade headquarters, two were organized "mech heavy" with two mechanized and one tank battalion, and one brigade was "tank heavy" with two

¹⁶ Sun-Tzu, *The Art of War*, translated by Ralph D. Sawyer (Bolder, Colorado Westview Press, Inc., 1994), 135

¹⁷ US Army, Field Manual 101-5. *Staff Planning Responsibilities* (Washington, DC: Department of the Army, 1992), 1-15

¹⁸ Frederick J. Brown, Ph.D, *The US Army in Transition II, Landpower in the Information Age* (McLean, Virginia: Brassey's, Inc., 1993). 87-98

¹⁹ Ibid, 88-90

²⁰ US Army Field Manual 71-100, *Division Operations*, (Washington, DC, US Department of the Army, 1990), 1-5 to 1-6

tank and one mechanized battalion. The armored division had one less infantry battalion and one more tank battalion than the infantry division.²¹

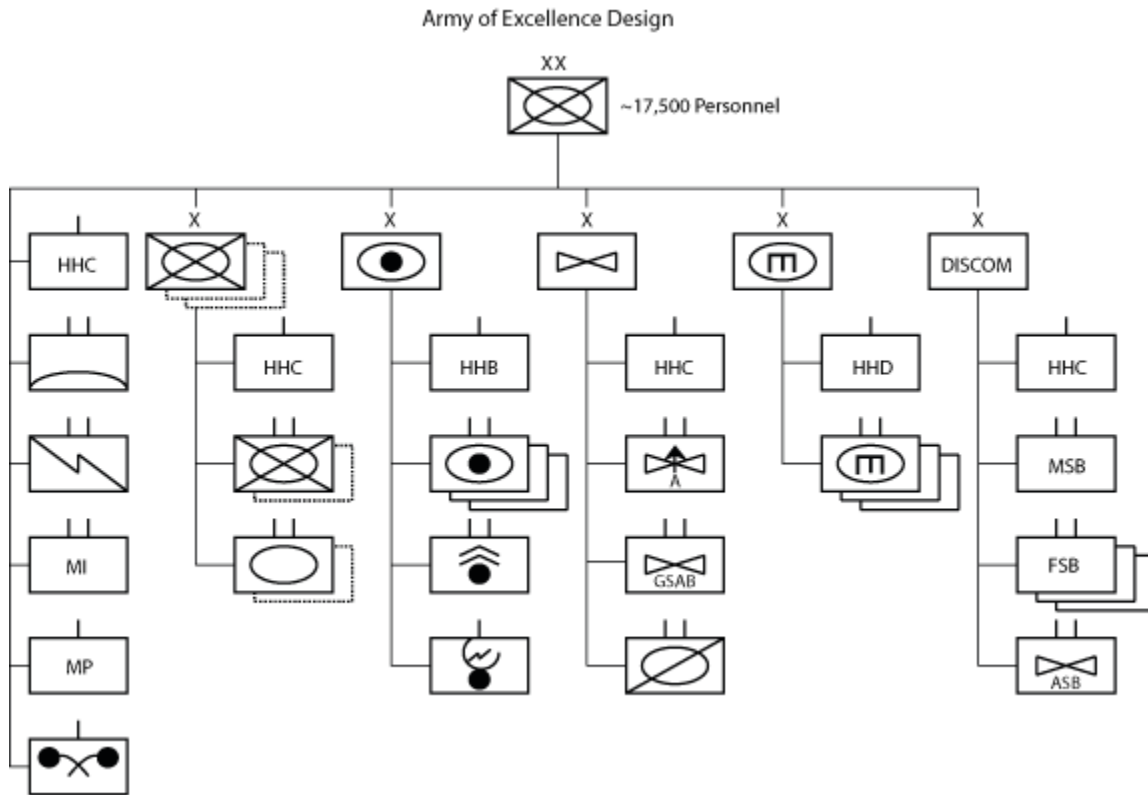


Figure 1 Army of Excellence Design

The AOE study group designed the heavy division organization which was reduced by 2,931 personnel. Air Defense assets and personnel were moved to Corps, along with the 8-inch howitzers. Division aviation capabilities and personnel were reduced, the functional battalions in the Division Support Command (DISCOM) were consolidated into a Main Support Battalion (MSB) and three Forward Support Battalions (FSB) reducing 360 personnel, and headquarters

²¹ Ibid, 1-4

units at company, battalion, brigade and division were reduced eliminating a number of administrative, maintenance, supply clerks, mechanics, and cooks. The AOE study as directed by the leadership targeted many logistics (non-combatant) personnel organic to each maneuver and functional battalion in addition to the personnel assigned to the DISCOM for elimination from the force structure all together to provide force structure for the light infantry divisions. While not all reductions were support personnel, the vast majority were.

The AOE divisional organizational structure developed a much leaner support structure. Many would argue that multifunctional FSBs and MSBs are a vast improvement in efficiency and effectiveness over the FAST concept. With this support structure the army has proven itself effective during recent operations such as Just Cause, Desert Shield and other operations with even more limited scope, duration and objectives. However, maneuver, combat support, and combat service support units have had to increase the duties and responsibilities of their soldiers through the cross training of non-MOS specific support skills such as supply, and administration. Some of these increased duties dovetailed easily with wartime duties such as the combining of driving and radio duties. With regards to company administration, supply and maintenance, this is often not the case. Though not spoken about or reported, companies often use shadow clerks in their headquarters, supply room and motor pools to support the daily unit operations. Soldiers force structured for other purposes are diverted from their preparations and training for combat to meet the very real logistical needs of many units.

Tooth to Tail Ratio

Reducing logistical footprints is not new for the Army; cutting “tail” has traditionally been the situation when forced to cut manpower; and trying to preserve the combat “tooth” of a division. In early 1980’s, when working the development of the AOE, planners needed to cut end-strength, and find a way to get to eighteen active divisions. The answer was, to cut the “tail” to save the “teeth.” Combat support and combat service support (CS/CSS) was cut to support

end-strength constraints, and AOE planners shaved CS/CSS to make 780,000 end-strength figure fit with 18 active divisions plan at the time.²² The only means of creating an eighteen active division force was by “drastic cutbacks in combat support and combat service support.”²³ The Army’s concept of reducing robustness and redundancy, formulated as R² led to the area support concept and multi-capable soldier concept.²⁴ The armored DISCOM was reduced from an end-strength of 3581 to 2810, for a net loss of 771 spaces. In an attempt to make this work, all direct support maintenance with exception of military intelligence and signal was consolidated under the DISCOM. “Major savings came from the elimination of the supply and transport, medical, and maintenance battalions, and placing some of these assets in a main support battalion.”²⁵ Manpower savings were also attempted by introducing new technology into the force.

The Army during AOE development went through a mental and physical transformation in terms of manpower, doctrine, materiel, and organization.²⁶ One of the overarching design objectives in heavy division logistics was to replace soldiers with better technological equipment, in an effort to minimize the tooth-to-tail ratio.²⁷ In the supply arena for example, less manpower was available for managing, storing, and issuing fuel and food, and in maintenance there was an increase reliance on corps units for repair parts.²⁸ In spite of the perceived benefits of improved technologies and organizations much of it did not provide true. Interestingly, in the late 1980’s, the Army used a term called “AOE risk,” to describe the risks associated with decrease in

²² John Romjue, “The Army of Excellence: The Development of the 1980’s Army”, TRADOC Historical Monograph Series (Fort Monroe, VA.: TRADOC, 1982), 26

²³ Ibid

²⁴ A.P. Dupay, “The Army of Excellence: At What Price to Combat Service Support”, Carlisle Barracks, PA:US Army War College, April 1998), 18

²⁵ Ibid, 20

²⁶ Romjue, 2

²⁷ Ibid, 93

²⁸ E.L. Andrews, “The Army of Excellence and the Division Support Command”, (Carlisle Barracks, PA.: US War College, May 1986), 18

CS/CSS manpower in expectation of gains in both efficiency and effectiveness from productivity enhancing initiatives.²⁹ The Logistics Center at Fort Lee initiated the Logistics Unit Productivity Systems (LUPS) program, which was a management program chartered to reduce CSS space authorizations while simultaneously trying to improve CSS unit productivity. The key to the program's success was attempting labor saving initiatives, such as: automated pipeline, robotic fueling, and expert diagnostics systems.³⁰ However, evidence cited by a Government Accounting Office (GAO) report, later criticized the LUPS program for failing to achieve the manpower savings through labor savings initiatives. The GAO attributed the failure to mismanagement of the program.³¹ History appears to be repeating itself. The GAO also noted the Logistic Center's assumption in the entire transition exercise was the Army's increased reliance on host nation support personnel - documentable by formal agreements in a friendly theater, but an unknown quantity in undeveloped theaters into which Army forces might have to go.

Role of the Support Battalion

Most organizational changes tend to be evolutionary. As General Donn A. Starry said about the development of Division 86 the army is never a "finished product" each iteration is "not a be all, end all."³² The same is true of Army of Excellence and the reorganization concept in support of the Army of Excellence division redesigned. Prior to the development of multifunctional logistics support battalions into forward and main support battalions at the division level, direct support to the maneuver battalion was provided by a forward area support

²⁹ US TRADOC Analysis Center, "Combat Service Support (CSS) Enabler Functional Assessment (CEFA)", (Fort Lee, VA.: TRADOC Analysis Center-Lee, 1998), 3-42

³⁰ Dupay, 23

³¹ Romjue, 109

³² Gordon R Sullivan, "Future Vision, A Vision for the Future." *Military Review* (May-June 1995), 4-14

team (FAST). The FAST was the command and control node for external support to the maneuver battalion. Support personnel attached from functional support battalions (Maintenance, Supply and Transportation, and Medical Battalions) in the DISCOM manned the FAST. This system was proven to provide inadequate command and control (C2) and inefficient support to maneuver battalions. This was due to ad hoc organizational flaws and the inability to build a cohesive support structure synchronized with other division support assets. Additionally noted during field operations, the staff of the functional support battalions were under utilized. To improve the shortfalls of the FAST system the forward support battalion was developed and was implemented during the reorganization of the US Army following Division 86 and the Army of Excellence. Reorganization of the functional support battalions in the DISCOM provided manning for the FSB and MSB. During this reorganization a support operations section was added to the support battalion staff. This allowed for close centralized planning with the supported maneuver brigade. This system allowed for a more consistent habitual support relationship prior to, during and following major training events and war.

Under AOE maneuver brigades have a habitually supporting Multi-functional FSB in direct support. The FSB's primary role according to FM 63-20 *Forward Support Battalion* is to provide direct support to the brigade, divisional units in the brigade's AO, and non-divisional units when augmented from higher level organizations. Four major elements make up the FSB: headquarters and headquarters detachment (HHD), supply company, maintenance company, and a medical company.

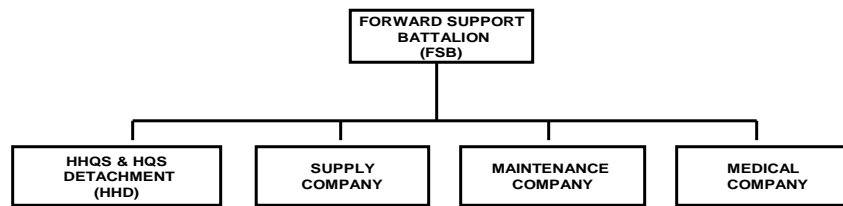


Figure 2 Forward Support Battalion - AOE

The HHD is the command and control hub for the unit administration and all internal and external support operations. The supply company receives, stores, and issues supply classes I (rations), II (clothing/textiles), III (fuel and lubricants), limited IV (barrier/construction materiel), VII (major end items) and transfer class V (ammunition). This organization also provides its own organization maintenance. The maintenance company fixes weapon systems and provides a common repair parts service from its base maintenance area and maintenance support teams (MSTs) in the maneuver battalion's train area. The maintenance organizational structure is not fixed and is contingent upon the task organization of the supported force, and performs an array of maintenance related functions: Direct support (DS) to supported units, limited recovery support, technical assistance, and receives, stores and issues class IX (repair parts). The medical company performs a myriad of important functions: medical treatment and or initial care to support further evacuation, ground evacuation from maneuver trains and casualty collection points, dental care, medical resupply, laboratory and radiology services, and a 40 patient hold facility. The organizational structure is based on a modular support system to allow for tailoring,

augmentation, or reinforcement.³³ The command and control node and disposition of FSB CSS units in the brigade AO, coupled with the available materiel and services provided by each of the functional companies, provides the brigade commander with a degree of flexibility and tactical mobility.

The Army of Excellence as a whole had not drawn significant criticism when its designs were revealed in late 1983. Once the reduction of the heavy divisions to build a stronger corps to conduct Air-Land Battle doctrine was well understood, there was general agreement on the shape of that predominant portion of the AOE.

Chapter II

The Unveiling of Force XXI

This chapter will provide a detailed look at the concept of Force XXI. First, it will provide a background on the concept of Force XXI. Second, it will describe the general structure change from the AOE Army to Force XXI design under 4th Infantry Division (Mechanized) (4th ID (M)). Third, this chapter will look at the “tooth to tail” ratios in 4th ID (M) and its new Brigade Combat Teams (BCT). Finally, this chapter will discuss the new role of the support battalion under Force XXI.

Concept of Force XXI

“Force XXI was the reconceptualization and redesign of the force at all echelons from foxhole to the industrial base, to meet the needs of a volatile and ever changing world. It would

³³ US Department of the Army, FM 63-20, *Forward Support Battalion*, (Washington, D.C.: Government Printing Office, 1990), 7-1 to 9-2

be a force organized around information and information technologies. Its purpose would be to deter those who opposed us, to compel when deterrence fails, and to reassure our friends and allies around the world that they can count on us. It would also stand ready to support disaster relief and humanitarian efforts within our own land. We must win the first battle...whatever it is.”³⁴

Based on the political vision of future U.S. leadership in a changing world, the U.S. Army needed to transform from a cold war army designed to fight a numerical superior Soviet force on the battlefields of Central Europe, to a flexible and agile tool for promoting U.S. national interests, and the interests of the free world at large. Force XXI was “the transformed army of the twenty-first century”³⁵, the end-state of a series of simulations and exercises that emerged through the Louisiana maneuvers in the 1992. Since then, the capstone document for the U.S. Army, FM 100-5 (Operations), has been revised and updated according to Force XXI experiences. TRADOC PAM 525-5 (Force XXI Operations) has been issued as a “Concept for the Evolution of the Full-Dimensional Operations for the Strategic Army of the early Twenty-first Century.”³⁶ Force XXI is defined in TRADOC Pamphlet 525-5 by five characteristics: doctrinal flexibility, strategic mobility, tailorability and modularity, joint and multinational connectivity, and versatility. In addition, TRADOC Pamphlet 525-5 describes the five battle dynamics for meeting the challenges of the future as battle command, battlespace, depth and simultaneous attack, early entry, and combat service support (CSS).

³⁴ G.R. Sullivan, *Force XXI, Americas Army of the twenty-first Century*, (Fort Monroe, VA, TRADOC, 1995), 1.

³⁵ Ibid, 6

³⁶ U.S. Department of the Army. TRADOC Pamphlet 525-5, *Force XXI Operations*, (Fort Monroe, VA.:TRADOC, 1994), cover page

Battle Command is the art of decision making, leading and motivating troops into action to accomplish the least cost in soldier and materiel.³⁷ Battle command in the future will change markedly from today's hierarchical structure, to a mix between hierarchical and intranetted structures, where technology allows for information to move freely between commanders, staffs, and soldiers according to information requirements.³⁸ A central tool will be Army Battle Command System (ABCS), which will provide everybody with a common relevant picture of the battlefield. The picture will be generated from a myriad of data input from nodes at all levels, and is supposed to be real time.³⁹

Battlespace is, in the physical sense, "...that volume determined by the maximum capabilities of a unit to acquire and engage the enemy, capabilities that will be greatly expanded by future technologies."⁴⁰ The term indicated a multi-dimensional sphere, in which a commander can array a multitude of service specific and joint capabilities, to include information operations and deep strikes. The increasing empty battlespace will facilitate rapid movement of combat power, and employment of different assets in a tempo that will render the enemy out of control of his forces⁴¹. Actions will overwhelm his decision-cycle, so that his ability to react to our moves will be impaired. Battlespace indicates dominance of all dimensions, not only the physical, but also cyberspace.

Depth and Simultaneous attack would "enable the commander to directly influence the enemy throughout the width, height, and depth of his battlespace to stun, then rapidly defeat the

³⁷ J.G.Miller and K.C.Reiting, "Force XXI Battle Command", *Military Review*, (July-Aug 1995), 5.

³⁸ TRADOC Pamphlet 525-5, 3-2

³⁹ The term "real-time" indicates that events, positions and statuses appear on the screen simultaneously with the occurrence. A real time picture is very difficult to achieve, especially on a higher level of command where information needs to be processed. For situational awareness purposes, a near-real-time will be sufficient.

⁴⁰ TRADOC Pamphlet 525-5, 3-8

⁴¹ Ibid, 3-9

enemy.”⁴² The overwhelming tempo in the operations will deny the enemy an accurate awareness of the situation; his reactions to our actions will be too late for effect, and his next peace of information will indicate a new crisis, which he will have to respond to. He will be paralyzed by his own inability to gain the initiative, and be subject to reacting to our actions. The attacks will be carried out with a variety of measures, lethal and non-lethal, as well as the full spectrum of joint assets. The implications of this principle will also be a blurring of the distinction between land-force operations, and joint operations. Components of all services and branches will cooperate on a very low level of command, putting extra challenges on the commanders at the tactical level.⁴³

The distinction between deep, close and rear operations will also need to be redefined. On a non-linear battlefield, where U.S. and enemy forces are interspersed on a seemingly empty space, the traditional front lines may be exchanged for zones of enemy activity, where our own forces will move in between pockets of enemy resistance that have little means of affecting our operations.

Early Entry would in a force projection setting be one of the most critical battle dynamics of the future. In a developing conflict, the ability to rapidly show force and determination in theater may convince the enemy that the U.S. intentions are serious, thus reducing the possibility of the conflict escalating into war in the first place. The early entry is most notable for the force projection army, where the ability to present a credible force in theater at an early stage may be

⁴² U.S. Department of the Army, TRADOC Pamphlet 525-71, *Force XXI Division Operations*, (Fort Monroe, VA.:TRADOC, 1997) 3-10

⁴³ Ibid, 3-11

crucial. The aim of the early entry force must be simultaneous application of force or control throughout the operational area.⁴⁴

Combat Service Support (CSS) in a future scenario would demand changing the present strategic, operational, and tactical level logistics in exchange for a seamless continuum.⁴⁵ The ability to support operations other than war (OOTW) as well as conventional operations, both unilateral and joint/combined operations required a CSS system that is modular, deployable, and flexible. The CSS system must also be prepared for the non-linear battlefield, so that every unit and function is able to perform in a hostile environment. Proper training and ability to perform a wide variety of secondary functions will be important in the future. The future battlefield will be characterized by an extended battlespace, where the traditional front-lines will be replaced by fluid, dispersed lay-out where no place may be characterized as rear or forward.⁴⁶

One of the most important objectives of Force XXI is to utilize emerging information management technology to gain information dominance on the battlefield. By being able to achieve total situational awareness, US forces will be able to employ combat means in a tempo that overwhelms the adversary. By gaining information dominance on the battlefield, U.S. forces will achieve perhaps a decisive advantage over the Adversity.⁴⁷ Future operations would be different from today, and the U.S. Army is presently rethinking the way future knowledge based operations in a joint environment will form a pattern of simultaneous mission analysis and force tailoring, reconnaissance, decisive actions and sustained actions or recovery.⁴⁸

⁴⁴ Ibid, 3-12

⁴⁵ Ibid, 3-14

⁴⁶ Ibid, 2-9

⁴⁷ U.S. Department of the Army. FM 100-5, *Operations*, (Washington, D.C.: Government Printing Office, 1998), 6-9

⁴⁸ TRADOC Pamphlet 525-5, 3-18

General Structure Change

The organizational and operational (O&O) concept states that a division under Force XXI (DXXI) primary mission is identical to the AOE division, which is to conduct combat operations to defeat or destroy enemy ground forces. While the basic division tasks have not changed dramatically, the manner and scope in which DXXI accomplishes them is significantly different from its AOE counterpart. The O&O concept highlights the fact that digitizing C2 architecture and weapon systems has led to a quantum leap in the division combat operations' tempo.⁵¹

DXXI conducts distributed operations at the time and place the commander chooses by using its improved C2, linked with improved target acquisition capabilities optimized for the employment of precision weapons, to simultaneously strike the enemy at multiple decisive points throughout its AO. DXXI accomplishes this via linkages to national and theater assets, as well as organic sensors, which provide commanders at multiple echelons within the division with superb intelligence and a relevant common picture (RCP) of the battlefield. The division uses this RCP to execute collaborative planning, create a superior situational understanding and conduct rapid maneuver to exploit the effects of precision fires.⁵² By comparison, the AOE division passes information vertically through multiple command echelons, each of which requires time to analyze and digest the data before passing it on, thus slowing down the decision-making tempo and often distorting the data.

In offensive operations, the DXXI organization is designed to maintain a higher operations tempo (OPTEMPO) in order to defeat a defending enemy force of equivalent size, whereas the AOE division was expected only to defeat a brigade-size force. In defensive

⁵¹ B.J.Johnson and M.J.Readon, "Restructuring the Division: An Operational and Organizational Approach", *Military Review*, (May-June, 1998), 6

⁵² TRADOC Pamphlet 525-71, 1-7

operations, the precision fires and accelerated OPTEMPO possible with the DXXI design would result in a more survivable organization that can successfully defend against three enemy divisions and still retain sufficient combat capability to quickly transition to follow-on missions.⁵³ The AOE division had a similar defensive capability but generally required substantial, extensive and deliberate reconstitution before it could be used to conduct follow-on missions.

DXXI reconnaissance and surveillance (R&S) forces provided a "focused telescope" to enable both maneuver and fires, reduce risk, aid in decision making and answer the commander's critical information requirements. The DXXI design has significantly enhanced R&S capabilities compared with its AOE counterpart. Information superiority, gained through links to national or theater assets and enhanced by organic R&S capabilities, is the major contributing factor that allows DXXI to habitually operate over a 120 x 200 km area, compared with the 100 x 100 km sector for an AOE division.⁵⁴

Rather than relying largely on direct fires to prevail in close combat like the AOE division is forced to do, DXXI integrates its organic combined arms capabilities to produce overwhelming effects throughout the depth of the battlespace, to include close combat. Information superiority, when translated into situational understanding, also increases the lethality of DXXI close combat through the digital linkages between C2, direct-fire platforms and indirect-fire systems. DXXI pinpoints critical enemy systems to engage with precision munitions within a compressed period of time. Digital linkages facilitate the maneuver element's ability to quickly follow up precision fires to exploit the effects and complete destruction of enemy forces.⁵⁵

⁵³ Ibid

⁵⁴ Ibid, 1-9

⁵⁵ Ibid, 1-11

The increased synergy between the separate DXXI combined arms team components led to the redesign of its maneuver battalions. DXXI features maneuver battalions organized with three maneuver companies equipped with a total of 45 combat platforms compared with the AOE division's four companies and 58 combat platforms. This redesign decision, which resulted in significant manpower and equipment savings, also increased tactical mobility (smaller physical footprint), reduced the logistic tail and decreased strategic deployment requirements while sacrificing none of the division's overall lethality.⁵⁶

The organic DXXI fire-support capabilities have also been improved over its AOE counterpart. The DXXI artillery organization will have a two-battery Multiple Launch Rocket System (MLRS) battalion that includes a target acquisition battery. This battalion enhances the division's counterfire abilities by combining the sensor-to-shooter links into a single C2 structure. The additional MLRS battery also doubles the firepower available for general-support mission execution. Improved rocket and cannon munitions, coupled with attack aviation, allows the division commander to execute shaping and decisive operations through a mixture of standoff attack or close combat. R&S assets will include dedicated organic target acquisition systems to expand the footprint of the division's long-range precision fires.

The DXXI sustainment structure also differs markedly from the AOE division support command (DISCOM) design. DXXI will feature a much-reduced logistics system that proactively tailors CSS to address specific mission requirements. This is in sharp contrast to the cumbersome AOE CSS structure that often stockpiled resources in anticipation of possible use. DXXI's centralized logistics includes battlefield distribution, throughput and stockage management enabling technologies. This centralized logistics concept has created a more agile

⁵⁶ Ibid, 1-12

and mobile support organization under which all division CSS assets have been assembled. All DXXI organic CSS elements are assigned to the DISCOM. However, forward support battalions and forward support companies (FSCs) will still be habitually associated with their respective maneuver organizations to provide continuous, responsive support. Maintenance and supply assets organic to all maneuver battalions have been collocated with the FSCs.

Sustainment during combat operations is closely linked with maneuver and fires. Given the need to maintain an accelerated OPTEMPO through rapid resupply and combat power regeneration, support considerations are taken into account by the commander from the mission's onset. Task organization, scheme of maneuver and fires, as well as branches and sequels to the basic plan, all incorporate anticipated CSS requirements.

Last, unlike the AOE design, DXXI features Reserve Component (RC) integration as an enhancement to its organic force structure. The division rear operations center will remain an integral part of the DXXI C2 architecture to assist in synchronizing and orchestrating sustainment operations. Other anticipated missions for individual RC soldiers include division and brigade staff augmentation, civil-military affairs representatives at brigade level, as well as division and brigade liaison teams.

Tooth to Tail Ratio in Division XXI

Throughout the Division XXI study, TRADOC's plan was programmed to leverage technology to support reductions in the number of Combat Service Support (CSS) soldiers required to perform specific functions. The objective for force designers and planners was to reduce manpower by increasing the use of automation in areas that deal with rations, fuel, and

other sustainment functions.⁵⁷ In TRADOC PAM 525-200-6, *Combat Service Support*, the roadmap for Force XXI doctrine, training, logistics, organizations, materiel, and soldiers (DTLOMS), it specified that tactical logistics required less soldiers because improved asset visibility and more timely and accurate reporting across the battlespace would minimize the need for supervisory redundancy. The pamphlet goes on to outline how new digital capabilities are to “minimize human intervention”, yet still allow for the right place, right time, right materiel, type support to take place on the battlefield.⁵⁸ When looking at the AOE heavy division and Division XXI logistics organizations, one can see the Army’s emphasis on shaving the “tail”, in anticipation of better sustaining flexibility, tactical mobility, and firepower of the combat force.

In the AOE heavy division there was 5169 spaces for CSS soldiers. Division XXI’s Division Support Command’s (DISCOM) strength is 4329, plus 272 in the remainder of the division. This leaves a total logistic space allocation of approximately 4601 spaces, and a net saving of 568 spaces in combat service support, or almost 10 percent reduction from AOE.⁵⁹ Over just the past two designs, the AOE heavy division and Division XXI, CSS has taken some deep cutbacks in manpower spaces. The problem however with these cutback measures was the relatively slow integration of new technologies that were programmed to offset the reduction in manpower. Programmed structures change designed to sustain the flexibility and tactical mobility of maneuver forces were never realized, and any efficiency expected only resulted in greater inefficiencies. One example, as stated earlier called the LUPS, a program that claimed it could do twice as much work in one half the time so then the army takes away the force structure

⁵⁷ TRADOC PAM 525-5, 3-20

⁵⁸ U.S. Department of the Army. TRADOC Pamphlet 525-200-6, *Combat Service Support*, (Fort Monroe, VA.:TRADOC, 1994), 5

⁵⁹ US Army TRADOC Analysis Center, “Combat Service Support (CSS) Enabler Functional Assessment (CEFA)”, (Fort Lee, VA.: TRADOC Analysis Center-Lee, 1998), viii

but never buy all the enablers that were promised, failed to achieve intended outcomes for the AOE.⁶⁰ LTG William “Gus” Pagonis, in his book *Moving Mountains*, writes about how logisticians were limited because they did not have certain “things” during Operation Desert Storm. Much of these shortfalls he attributed to “tight budgets and tough choices as the order of the day for many years.”⁶¹ The “tough choice” LTG Pagonis is referring to are between the “tooth” and “tail.” Historical evidence thus far has clearly shown the “tooth” always comes before the “tail.” The next section takes a closer look at the forward support battalion under Division XXI.

Role of the Forward Support Battalion (FSB)

The Army's Division XXI Division represented a leap forward into the realm of 21st Century technology. The smaller Force XXI Division possessed greater lethality, quicker mobility as well as the combat service support (CSS) imperative of situational understanding (SA). Real time "situational understanding" means a complete, common relevant picture (CRP) of the battlefield for every commander. This information enabled Division XXI commanders to quickly mass forces, allowing this division to defeat a larger, but less technologically advanced enemy.

The CSS structure's capability to project, receive, and support this force would directly impact the effectiveness of future military operations. The Division XXI battlefield imposes new challenges on support functions and leaders, as it calls for independent logistical systems and procedures. Using the Division XXI's enhanced digital logistical awareness and forecasting capabilities, CSS leaders at all levels must provide the foresight and responsiveness necessary to

⁶⁰ Romjue, 8

anticipate and maintain the division's operations tempo (OPTEMPO). Division XXI logistics required new organization, new doctrine, as well as advanced distribution equipment and information technology.⁶²

The concept and organizational structures reflect a paradigm shift from a supply-based CSS system in Army of excellence (AOE) to an advanced distribution-based CSS system for Force XXI. Technology would enhance this capability. A distribution-based logistics system combined situational understanding capabilities with efficient delivery systems to form a seamless distribution pipeline. This pipeline represented "inventory in motion" and the CSS imperative of increased velocity. In contrast, static inventories comprised the AOE supply-based system. Storing this static inventory, in large stockpiles at each echelon does not provide the mobility or flexibility required by the Division XXI maneuver commander.

The Division XXI distribution-based system eliminates most stockpiles and substitute speed for mass. Logisticians would control the destination, speed, and volume of the distribution system. With intransit visibility (ITV), total asset visibility (TAV), advanced materiel management, and advanced decision support system technology, Division XXI logisticians would have access and visibility overall of the items within the distribution pipeline. This visibility allowed logisticians to redirect, cross-level, and mass CSS assets more effectively in support of the maneuver commander's intent. The distribution-based systems gained speed through greater efficiency. Direct throughput from theater and corps to the brigade battlespace was the rule rather than the exception with distribution-based logistics. Throughput distribution bypasses one or more echelons in the supply system to minimize handling and to speed delivery to forward units.

⁶¹ LTG William G. Pagonis with Jeffery L. Cruikshank, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War*, (Boston, MA: Harvard Business School Press, 1992), 202

Supplies were tailored and packaged for specific supported units based on a specific time and location point of need, synchronized through support operation channels based on the combat commander's OPTEMPO. Advanced delivery platforms such as the palletized load system (PLS) and the container roll in/roll out platform (CROP), would use ITV/TAV to deliver directly from echelons above division (EAD) to points as far forward as possible. Extensive use of "hub and spoke" transfer nodes would reduce transportation and materiel handling requirements.

Division XXI battlefield CSS operations provided support as close to the point of need as possible. A common relevant picture coupled with information from the global combat support system-Army (GCSS-Army) allowed the Division XXI CSS commander to anticipate requirements and project support further forward than ever before. Force XXI Division CSS organizations would be modular, mobile, and multifunctional.⁶³ They adapted to support force projection and velocity of combat operations in both linear and non-linear environments.

The creation of multi-functional support companies (FSCs) within the Division XXI FSB consolidated CSS organizational elements currently embedded within the AOE maneuver battalion with the direct support (DS) capability currently in the AOE FSB. The consolidation of all classes of supply and maintenance within the forward support, brigade support, and headquarters and distribution companies serves as an example of enhanced efficiency and effectiveness. Modular, multi-functional support companies and logistics command and control (C2) in direct habitual support allow the maneuver commander to focus on their core missions.

The Division XXI multi-functional FSB provides direct support (DS) to brigade level combat teams. The FSB could function in a highly dispersed manner, with some FSB elements

⁶² U.S. Department of the Army, TRADOC Pamphlet 525-200-6: Combat Service Support, (Fort Monroe, VA 1994), 3.

⁶³ Ibid

close to the maneuver units and others near the brigade rear area. The FSB commander is the brigade commander's senior battle logistician and serves as the single CSS operator for support to the maneuver brigade. His battle staff monitors and manages sustainment operations through an array of digital information systems and other technological innovations. The FSB provides all logistical support, and ties together the entire spectrum of supply and services, maintenance, and medical for the maneuver brigade. The maneuver commander, however, while "unencumbered", must be involved in synchronizing the maneuver of the FSB and its subordinate companies with the inbound shipments from echelon above division (EAD).

For the Force XXI brigades, all CSS, minus medical, for maneuver and engineer units, has been consolidated into the new FSB design. The FSB places a single smaller footprint on the battlefield through dispersion and centralization of services and support. This FSB, with centralized distribution management of CSS, frees the maneuver brigade commander from complex logistical support and task organization decisions. This provides him greater flexibility and mobility. The Force XXI FSB (figure 4) contains forward support companies (FSCs), a brigade support company (BSC), a forward support medical company (FSMC), and a headquarters and distribution company (HDC).

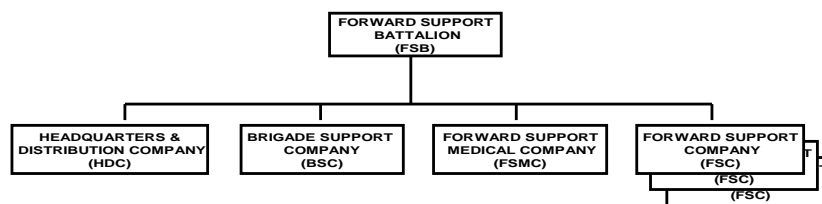


Figure 4 Forward Support Battalion - Force XXI

The FSCs provides multi-functional support, both organizational and DS, directly to a maneuver battalion task force (BN/TF). The BSC provides maintenance support, both organizational and DS, directly to the maneuver brigade. This includes the engineer battalion,

brigade HHC, and the brigade recon troop (BRT), and DS only maintenance support to the artillery battalion. It also provides limited reinforcing/back-up support to the FSCs. The FSMC provides Echelon I and II combat health support (CHS), to include sick call, advanced trauma management, limited laboratory and x-ray, dental treatment, combat stress control, preventive medicine, patient holding, and medical evacuation within the FSB support area. Corps maintenance plugs may augment the FSB in order to provide back-up support capability forward. The HDC provides all classes of supply, minus VIII for brigade units not supported by one of the FSCs. The next chapter looks at the next major change in the Army's structure; The Modular Force.

Chapter III

The Modular Force

Definition of Modularity

Modularity is a force design methodology which establishes a means of providing force elements that are interchangeable, expandable, and tailorable to meet the changing needs of the Army. Modularity will provide tailored functions and capabilities needed by force projection forces across the range of military operations. Modularity will provide the methodology for the Army to achieve a force structure that will optimize rapid assembly of mission oriented contingency forces that are effective and efficient. Modularity will provide a means of rapidly identifying, mobilizing, and deploying doctrinally sound, sustainable, and fully mission capable elements/organizations capable of operating in a joint and combined environment.⁶⁴

⁶⁴ U.S. Department of the Army, TRADOC Pamphlet 525-68, *Concepts for Modularity*, (Fort Monroe, VA.:TRADOC, 1995), 1

Transforming to a Modular Army

Changes in the world and political environments over time have resulted in changes to our National Military Strategy. The United States Army has changed from a forward presence and rapid reinforcement force to a force projection force. The Army has taken on an ever increasing array of potential missions to include drug interdiction, peacekeeping, humanitarian missions, and disaster relief. However, the Army's primary mission will continue to be that of deterring war, and if deterrence fails to fight and win, decisively. As a result of these changes, today's soldiers are now more likely to be deployed than ever before. Force projection around the world is a difficult task. Commanders must often deal with force strength constraints, limits on available forces, dollar constraints, and limits on strategic lift required to transport the necessary capability into the theater. Often times, commanders required a function to be performed which does not warrant the deployment of an entire unit. However, deploying portions of units can render the parent organization incapable of performing its mission (lack of key personnel and equipment).

Modularity provides a force design methodology which aids in, solving these dilemmas. It enhances the Army's ability to rapidly respond to a wide range of global contingencies with a force possessing needed functions and capabilities, while deploying a minimum of troops and equipment. It is a methodology which puts the right amount of the right functions and capabilities in the right place at the right time.⁶⁵ At the same time, it also leaves behind the remainder of an organization which can be deployed later or can provide mission capable support elsewhere if needed. In the force projection Army, this capability will become critical and indispensable. Modularity enables the Army Service Component Commander (ASCC) to

⁶⁵ Ibid, 2

package the correct balance of combat, combat support (CS), and combat service support (CSS) units to properly execute a Commander in Chiefs (CINC's) mission.⁶⁶

On January 28, 2004, Army Chief of Staff, Gen. Peter Schoomaker, briefed the House Armed Services Committee on plans to restructure the Army's current organization. The service will retain the 10 division headquarters as battle command headquarters but move some enabling resources - such as air defense, signal and intelligence - to the brigade level. The Army would also increase the number of brigades under those divisions from three maneuver brigades to four. That alone would take the service from 30 brigades under the division structure to 40. Growing the fourth includes taking much of the division-level support elements such as engineers, military intelligence, supply and maintenance units and making them organic to the brigade structure. The restructuring would leave a division with three types of brigades: heavy, Stryker or light with airborne and/or air assault capabilities. Gen. Schoomaker's guidance to TRADOC was to create a modular "brigade-based" Army that is more responsive to Regional Combatant Commanders' needs, better employs Joint capabilities, facilitates force packaging and rapid deployment, and fights as self-contained unit in non-linear, non-contiguous battlespaces.⁶⁷ Gen Schoomaker's approach was: 1) Create modular, Corps and Division headquarters for assignment to regional combatant commanders to command and control Army, Joint, and multinational forces; 2) Create modular heavy and infantry Brigade Combat Teams designed and organized to deploy and fight on arrival under the Joint Force Commander or a designated Army commander; 3) Create modular functional and multifunctional Support Brigades designed and organized to deploy and fight on arrival in support of Joint or Army headquarters and/or Brigade Combat Teams; 4) Use

⁶⁶ Ibid

⁶⁷ From interview on 9 Nov 2006 with LTC Dave Komar Chief of Design, TF MOD and Transformation Branch Chief, Force Design Directorate, Fort Leavenworth, KS

combinations of the modular constructs defined in headquarters and brigades to create flexible, scalable forces in response to regional combatant commander needs.⁶⁸

Transforming to a Modular Force

- The Modular Force is about packaging units into flexible configurations – a toolbox of capabilities for the Regional Combatant Commander
- Modular units are rapidly deployable, responsive, agile, and can be tailored into discrete packages of land force combat power

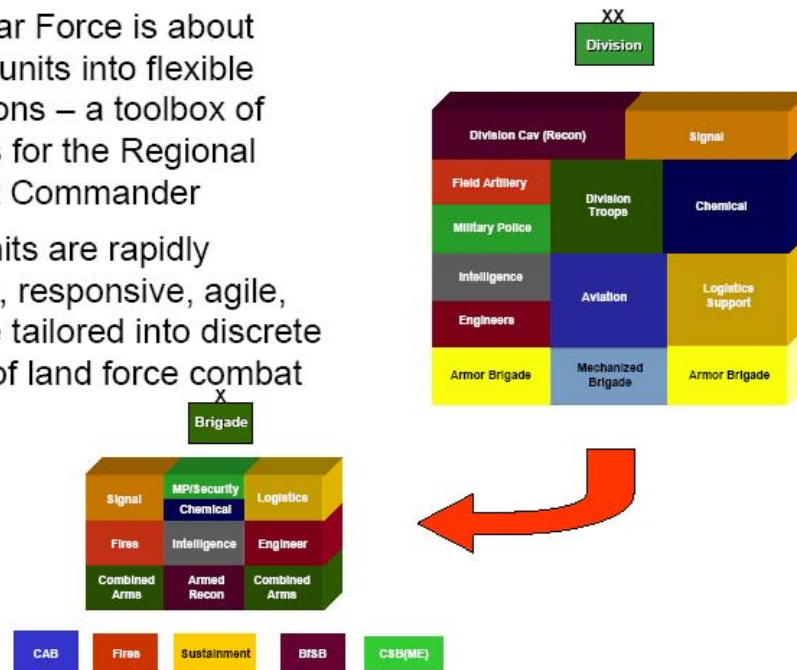


Figure 5 Transforming to a Modular Force

This is an Army initiative, and Training and Doctrine Command has the long-term mission. TRADOC was given the responsibility of focusing on Modularity, which is one of Schoomaker's 16 focus areas. Modularity would give smaller units a degree of flexibility and more power. Previously, whenever there was a change to be made in the Army it would be handed to TRADOC to do an analysis and within a few years come up with and execute a plan. The constraint placed on the TRADOC design effort is that the redesigned division cannot have additional soldiers. To oversee TRADOC's design and development of the future force for the

⁶⁸ Ibid

Army, a Futures Center was stood up, realigning functions and resources from the headquarters staff and from the Objective Force Task Force. The Army will continue to support operational deployments/rotations while assuming more missions as needed support national war aims. Changing the organizational structure of units must be logically consistent with future force concepts but tempered by the technological capabilities that are reasonably available within the near term.⁶⁹

To accomplish this, brigades would be restructured into modular brigade combat teams (BCTs). Once transitioned, BCTs would enable greater capacity for rapid packaging, responsive and sustained employment to support combatant commanders. BCTs would also enhance the expeditionary and campaign qualities of Army forces by better enabling Joint/coalition operations. The transition to BCTs would also increase the brigade-equivalent forces available to meet both enduring and emerging mission requirements.⁷⁰

The Army's post-Cold-War organizations were not as flexible and responsive as the new operational environment required. They met Joint Forces Commanders' (JFC) needs, but at high costs in organizational turbulence, inefficiency, and slower response times than desired. Supporting sustained operations and fielding forces for several simultaneous contingencies were difficult with Army corps and divisions. To provide a Regional Combatant Commander (RCC) with fightable Army forces, the Army had to disassemble division and corps structures, assigning specialist units to purpose-built task forces and leaving inoperable remnants at home station. Moreover, because the active Army's base of support troops did not contain sufficient specialized troops, the Army often had to activate Army Reserve and National Guard units to support deploying ad hoc task forces. These challenges, combined with a completely changed strategic

⁶⁹ TRADOC Pamphlet 525-68, *Concepts for Modularity*, 4

and operational environment, spurred the Army to undertake the most comprehensive redesign of its field forces since World War II.

Concept of the Modular Force

The Army is at war. Since Operation Desert Storm in 1990 it has been committed to a series of operations that have intensified since the attack in September 2001. As part of the Global War on Terrorism, Army and joint forces have deployed repeatedly for conventional and unconventional warfare, and on missions as different as noncombatant evacuation, peacekeeping, and homeland security. Wartime missions and circumstances have forced the Army to adapt to enemies and conditions logically, changing old arrangements decisively and quickly. Even if worldwide contingencies were not forcing the pace of action, the Army and the joint force would still face change. Strategic adjustments after the Cold War--new opponents, new liabilities, and new opportunities--and the need to accommodate constant technical developments would have made the Army change in order to remain effective. Since 1999, the US military has evolved dramatically under the pressure of strategic challenges, combat experience, and technological change. Getting the full benefit of this combat power has been a major consideration in revising Army operations and organizations.

The major focus of Army transformation is to provide Army flexible and responsive capabilities to JFCs at the right place and right time.⁷⁰ Flexibility is vital to implementing the new fighting concepts and to responding to the wide range of operational challenges. Responsiveness is characterized by three attributes: First, Army forces will be modular, allowing for a selective mix of Army units that meets the exact needs of the RCC at any given time and

⁷⁰ Ibid, 5

⁷¹ Ibid, 1

place in the campaign; Second, Army forces will deploy more capable forces directly into the JOA at the outset of the campaign, allowing JFCs to exercise the full, complementary range of joint capabilities and confront the enemy with a nearly insoluble dilemma. Third, the higher-echelon command structure will provide the RCC with a scalable battle command capability allowing distribution of joint and land command and control across the JOA with greater effectiveness and efficiency. This evolution has transformed operations from loosely linked, service-dominated operations into fully integrated, mutually supportive joint campaigns.

Division-based to Brigade- based ARMY

Throughout the 20th century, the Army's most-used and most familiar combat organization was the division. Formed with a standard number of brigades or regiments (usually three) and a division base of specialty troops, divisions numbered from 10,000 to 16,000 Soldiers and employed all the Army's fighting systems. Divisions fought battles to gain tactical advantage under command of corps. These battles formed links in the chain of campaign design and, properly arranged in time and space, moved the land force toward its operational goals. Close coordination and direct support of brigade operations characterized the tactical activities of divisions. Division battles and engagements took place over considerable space, but their brigades operated close to each other and typically depended on their neighbors' success or reinforcement and on combat and logistic support from the division.

Divisions needed a corps headquarters to coordinate their use by the JFC. They also relied on outside liaison teams to cooperate with other components' forces. The air component supported divisions directly with close air support and less directly with air interdiction and air defense that helped shape battlefield operations and preserve the division's freedom of action. Special operations forces rarely played a direct part in division battles, although they provided civil affairs and psychological operations liaison to divisions when necessary. Notably, divisions lacked the ability to work directly for a JFC without extensive augmentation.

The brigades of the divisions normally fielded three or four combat maneuver battalions but received most other specialty support—for example, artillery, engineers, communications and logistics from division-level units. In World War II and Korea, infantry regiments fought as relatively fixed organizations consisting of the same supporting elements for extended periods. While brigade doctrine of the Cold War period stressed flexibility in brigade organization, the tendency for habitual relationships between combat brigades and their supporting units to develop led to de facto fixed organizations similar in principle to the new BCTs.

These stable relationships proved their value in combat. In Panama, the first Gulf War, Afghanistan, and the recent war in Iraq, Army brigades showed an impressive ability to fight independently in widely separated, semi-independent engagements. Closer, faster, more dependable integration of joint fires and intelligence support bolstered that greater independence. Additionally, brigades showed that they could deploy to a theater of war and initiate operations before the arrival of the full division. Commanders in developing theaters used a building block approach to structure offensive and defensive operations around the successive arrival of brigades. Employing brigades as the Army's standard tactical element builds on Army experiences at the turn of the 21st century. It allows new approaches and faster reactions than the older division-based organization did. The "rolling start" of Operation Iraqi Freedom from the Iraq-Kuwait border to Baghdad exemplified how brigade-based operations have changed the way JFCs and JFLCCs fight.

Brigade Combat Teams

Army senior leaders and force designers developed the division headquarters and the BCT to get the greatest benefit from this capability shift. Division commanders will exercise

mission command⁷² over BCTs. Mission command reduces the number of coordinating and supporting tasks, while the BCTs fight with greater independence in more widely separated engagements and battles. BCT commanders are expected to receive minimal orders from the division commander, seize the initiative, and collaborate with other BCT commanders in the division to accomplish the mission. BCTs would be the primary organizations for fighting tactical engagements and battles. BCTs would have one of three standard designs: heavy brigade combat team (HBCT), infantry brigade combat team (IBCT), and Stryker brigade combat team (SBCT). These BCTs include battalion-sized maneuver, fires, reconnaissance, and logistic subunits.

⁷² mission command – The conduct of military operations through decentralized execution based upon mission orders for effective mission accomplishment. Successful mission command results from subordinate leaders at all echelons exercising disciplined initiative within the commander's intent to accomplish missions. It requires an environment of trust and mutual understanding. (FM 6-0)

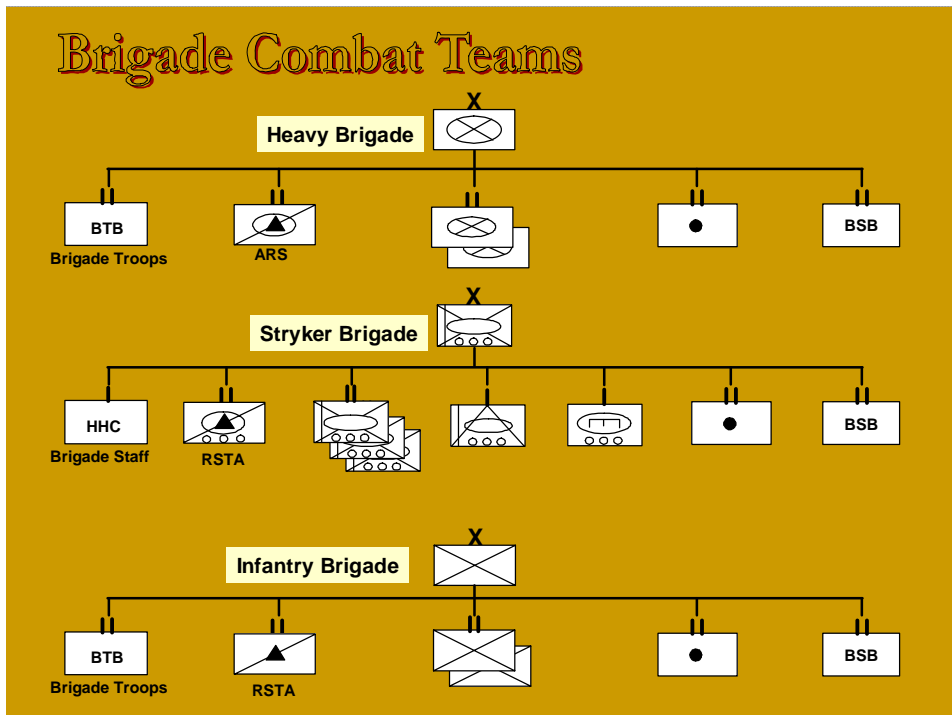


Figure 6 Brigade Combat Teams

Assuming some risk in the short term, the Army leadership has reduced the number of combat maneuver battalions in HBCTs and IBCTs from the three normally organized under divisional brigades to two in BCTs. However, BCTs also include an organic cavalry squadron not found in divisional brigade organizations. The cavalry squadron gives BCT commanders an enhanced ability to develop combat information, to include fighting for information when necessary. Accepting this risk will give the Army more brigade-sized organizations, create greater standardization among them, and reduce the time and lift needed to deploy land combat forces.

The new BCTs (see figure 7) have organic close combat, combat support, and combat service support capabilities. They are organized as combined arms units down to battalion level. Cross attachment of companies between battalions, common in divisional brigades, will no longer be required. This will increase the cohesiveness of battalions. A command and control system that includes networked information systems, combined with advanced sensors and better

analysis and information management, will allow BCT commanders to see, understand, and share tactical information more rapidly. Longer-range precision weapons and sensors will permit some engagements to begin before maneuver formations make contact. More precise lethal and suppressive close combat weapons make it possible to conclude combat more rapidly.

Additionally, leaders will develop combat power more effectively because of a higher leader-to-led ratio, advanced information systems to support command and control, and their greater capability for reconnaissance.

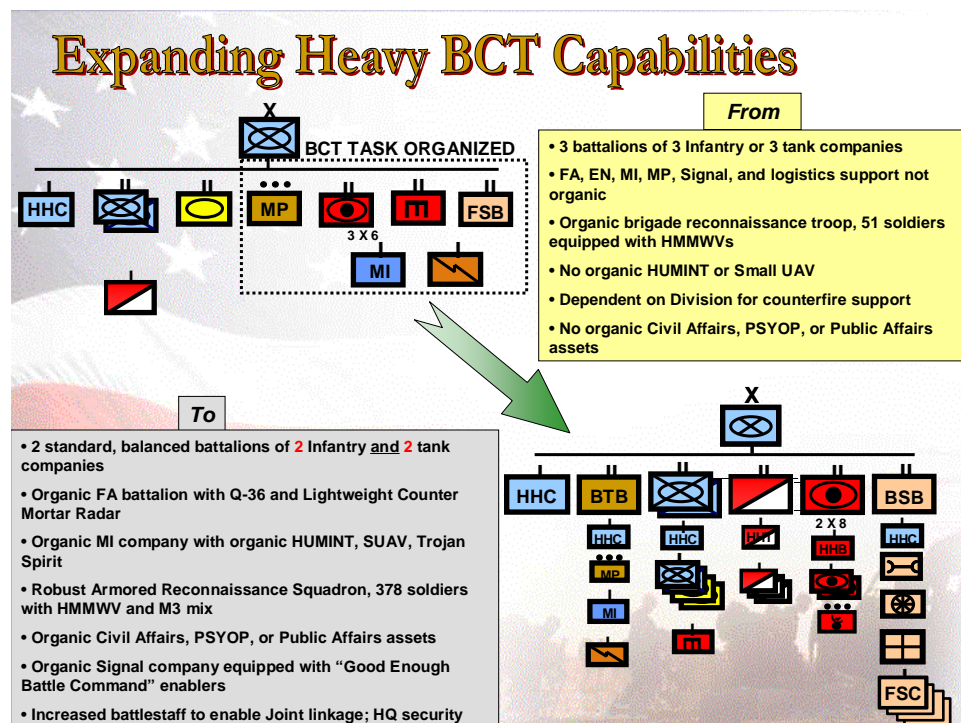


Figure 7 Expanding Heavy BCT Capabilities

Tooth to Tail Ratio

To be able to compare the new modular heavy BCT to Force XXI, one needs to understand that Force XXI brigade received a typical division slice when it deployed. This slice came from divisional parent units such as the DISCOM, DIVARTY, DIVENG, signal, military intelligence, and air defense artillery battalions. Force XXI heavy brigades had 1410 soldiers

assigned⁷³ and received 2253 soldiers from those divisional units for a grand total of 3663. The forward support battalion with its' additional slice from the main support battalion was 1095 soldiers. This equates to a tooth to tail ratio of 3.34 to 1. The modular BCT has all units assigned with a total of 3745 soldiers with 1146 in the support battalion for a tooth to tail ratio of 3.27 to 1. (See Figure 8)

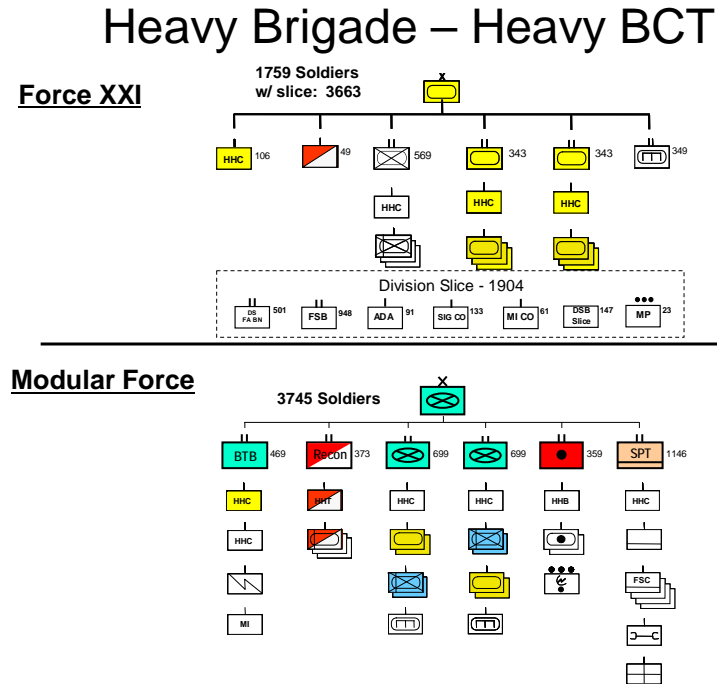


Figure 8 Heavy Brigade vs. BCT Tooth to Tail

Role of Logistics in the Heavy Brigade

Today's operating environment (OE) has a significant impact on Army support concepts and logisticians must adapt to these conditions. In a theater of operations, with combat forces

⁷³ Fort Knox Supplemental Manual (FKSM) 71-8 Armor/Cavalry Reference Data, (Directorate Force Development, Fort Knox, 1999)

widely distributed and operating in often non-contiguous areas, support must be provided in innovative ways, leveraging new technologies and new ideas. Support that does not come in a continuous stream across the communications zone, but in distinct packages is pulsed logistics. This is a new method for the commander who can take advantage of pulsed logistics with this redesign as the most commonly expected method of sustainment operations. These packages include the support units, as well as engineers, air and missile defense, and combat units for security—a combined arms approach for logistics support. Pulsed logistics assists combat commanders in maintaining a high degree of combat power, while, at the same time reducing the requirement on logistics units or their supported units to secure lines of communication (LOC) at all times and in all places within the battlespace. Pulse operations such as a mission staging operations (MSO) will be used where division operations allow for cycling of the maneuver brigade combat teams to temporary bases where the brigade rests, refits, and receives large quantities of supplies. Hence, pulse operations are used so that maneuver units pulse in and out of contact to be replenished and returned to the fight, or readied for another mission. Pulsed logistics is especially important when sustaining combat units are widely distributed over a non-contiguous battlefield or a battlefield with LOC that can only be secured temporarily.

In today's contemporary operational environment (COE), support can no longer be viewed as a free, continuous, and secure function. In many type of operations, support is at risk as much as maneuver, with maneuver units having an effective duration that will expire if support is not reestablished when cut off, or if the maneuver units are not directed to another source of support. Digitization will not make up for poor training or poor proficiency on basic war-fighting skills. No longer can logisticians expect the combat arms units/Soldiers to ensure their

security without active participation by the Soldier and their leaders who happen to be logisticians. All Soldiers will be responsible for their personal security and fighting as part of a combined arms fight when necessary.

One goal of a transformed logistics system is to reduce reliance on stockpiles and static inventories located at each echelon; a characteristic of the old Army of Excellence (AOE) supply-based system.⁷⁴ In addition, the reduction of large stockpiles is assisted by the accuracy of reporting of requirements by the user and the logistician establishing trust within the system. This does not mean that there will be no on-hand supplies within the HBCT. For example: the unit will have limited combat spares (limited prescribed load list (PLL), shop and bench stock). Consequently, once the request is submitted it is expected that it will be satisfied in a timely manner (i.e. no need for the PLL clerk or supply sergeant to reorder multiple times to ensure success). Use of the Battle Command Sustainment Support System (BCS3) is designed to assist with developing the needed trust by painting a logistical common operating picture (LCOP) that is accurate and timely. Therefore, distribution in the new logistics system substitutes reduced “order to receipt” time for large amounts of mass. This logistics system combines a LCOP and capabilities with efficient, yet effective delivery systems to form a seamless distribution pipeline. In essence, the supply pipeline becomes part of the warehouse, representing inventory in motion, thereby reducing but not eliminating both organizational and material layering in forward areas.

Logisticians control the destination, speed, and volume of the distribution system. With in-transit visibility (ITV), total asset visibility (TAV), advanced materiel management, and advanced decision support system technology, logisticians have access and visibility over all items within the distribution pipeline. This visibility allows logisticians to redirect, crosslevel,

and mass sustainment assets more effectively in support of the maneuver commander's intent. Logisticians also maintain situational understanding of the battle-space via the LCOP, which greatly facilitates planning and execution. The current BCS3 has enhanced the original LCOP.

The logistics system relies on reduced order to receipt time to produce efficiency, but is designed with an overall intent to be effective in a combat environment. Direct throughput from the theater's sustainment brigade to the HBCT's BSB or, as needed, to the FSC in the maneuver battalion, is a goal of distribution-based logistics. Throughput distribution bypasses one or more echelons in the supply system to minimize handling and to speed delivery to forward units. Advanced materiel management allows supplies to be tailored, packaged and placed into configured loads (CL) for specific supported units based on a specific time and location point of need, and synchronized through distribution management channels based on the combat commander's mission and operation tempo (OPTEMPO). Advanced delivery platforms, such as the palletized load system (PLS) and the container roll in/roll out platform (CROP) will be used to deliver materiel to supported units. Using ITV/TAV, delivery will be tracked and managed from higher echelons to points as far forward as possible. Additional enablers will include advanced satellite based tracking systems, movement tracking system (MTS) and radio frequency identification (RFID). Radar tracking station (RTS) tags, which provide detailed distribution platform interrogation of items/material/stocks that, in turn, provide detailed asset visibility to the distribution system managers and forward units; a much improved materiel management system. BCS3 assists this process greatly.

A secure intermediate staging base (ISB) located in close proximity to the area of responsibility (AOR) may be required to conduct rapid resupply when needed. An example of

⁷⁴ U.S. Department of the Army, Modular Force Logistics Concept (Draft), Version 5 (Fort Lee,

this is Kuwait for all Logistics operations in Iraq and Afghanistan. All these aforementioned methodologies allow modular logistics units to focus on their supported units while conducting its own force protection operations.

HBCT logistics principles have evolved from the principles and doctrine for Force XXI and the Stryker brigade combat team (SBCT). These evolving principles assist the logistician's battlefield challenges by incorporating advanced information and transportation technology, streamlining logistics organizations, and shifting from the AOE supply-based logistics system to a distribution-based system. The following are the logistics principles for the HBCT: 1.) Dedicated logistics operator; Unity of command for sustainment within maneuver units; Echelon above brigade (EAB) logistics commander is the single point of contact for support. 2.) Increased velocity with reduced order-to-receipt time. 3.) Situational understanding (SU) achieved with the assistance of a LCOP. 4.) An agile logistics system.

A dedicated logistics operator incorporates the unity of command imperative by centralizing distribution management and providing the unit maneuver commander assigned/organic logistics as the focal point for sustainment operations at each echelon within a brigade. The HBCT commander, based upon staff and BSB commander input, will order cross leveling, redirecting and massing of sustainment assets. Unity of command (single point of contact for logistics) at EAB for logistics facilitates the cross leveling, redirecting, and massing of sustainment assets within and between echelons down to the HBCT, and is an essential element of the distribution-based concept for the sustainment brigade. Within the HBCT, the maneuver commanders have OPCON over the FSCs and medical assets assigned/organic to their units.

Thus, the HBCT commander is the leader who surges sustainment with logistics assets assigned to the HBCT (e.g. directs a maneuver commander to cross-attach FSC assets to another battalion).

Increased velocity refers to the time required, once the support requested is submitted, to move supplies, equipment, and capability from the strategic base through the distribution system to the end user. This is especially critical for the HBCT. Replenishment and how long it takes is very time sensitive to the combat commander's ability to shape the battlefield conditions. The increased velocity concept, now doctrine, relies on effective command and control provided by unity of command coupled with situational understanding. An example of increased velocity is the ability of the sustainment brigade to by-pass the BSB to deliver configured loads directly to the FSCs.

Situational understanding (SU) is the product of applying analysis and judgment to the COP and LCOP to determine the relationships among the factors of METT-TC (see FM 6-0). Situational understanding for logistics refers to the logistician's complete picture of the friendly situation, the enemy situation, and the logistics situation. Quite often this is obtained through the use of information technology enablers (e.g. BCS3). It enhances decision making by identifying opportunities, threats to the force or mission accomplishment, and information gaps. Situational understanding, based on COP and LCOP, fosters initiative in subordinate commanders by reducing, although not eliminating uncertainty. The COP and LCOP have limits, as they require constant verification to assist with developing a situational understanding. SU focuses on the current situation, however, achieving accuracy depends at least as much on human judgment as on machine-processed information—particularly when assessing enemy intent and friendly combat power. Simply having a technologically assisted portrayal of the situation cannot substitute for technical and tactical competence. The logistics system is now able to have a logistics COP of what the maneuver commander needs. The logistics system now knows through predictive analysis when and where the maneuver units need their support without wasting assets. For example, through the use of BCS3, the FSC commander knows that a LOGPAC with Class

III (bulk) is due at a specified time and with a specified amount of fuel. However, due to enemy interdiction of the LOC, the FSC commander and battalion S4 will know that the specified time is delayed two hours with no enemy impact upon the fuel for replenishment operations. The impact upon the combined arms battalion will be minimal as the refuel requirement had a four-hour window to receive the fuel and it only takes one hour to refuel. The mission will not be impacted and the battalion commander is so advised.

An agile logistics system is one that takes the preceding principles and allows the commander to use their command position to provide the ability to surge support and provide recommendations based upon the ability to paint a picture with the LCOP provided by the latest technology enablers (e.g. BCS3 and FBCB2.) This allows the flexibility to ensure that the commander has the ability to use the modular unit concept to meet specific missions or needs as they develop or are anticipated. Because this allows commanders to provide modular support based upon the mission, it therefore reduces the logistics footprint in the battlespace. The reduction of personnel, equipment and supplies improves the agility of the HBCT during maneuver operations. The key to agility is to place on the ground only those modular logistics assets that are definitely needed for the mission, no more or no less.

The HBCT BSB is organized to perform distribution-based sustainment functions in accordance with corps, division, and theater sustainment command logistics concepts. The BSB (Figure 4) consists of a headquarters and headquarters company (HHC), a distribution company, a maintenance company, a medical company and four forward support companies(fires, armed recon squadron, and two maneuver).

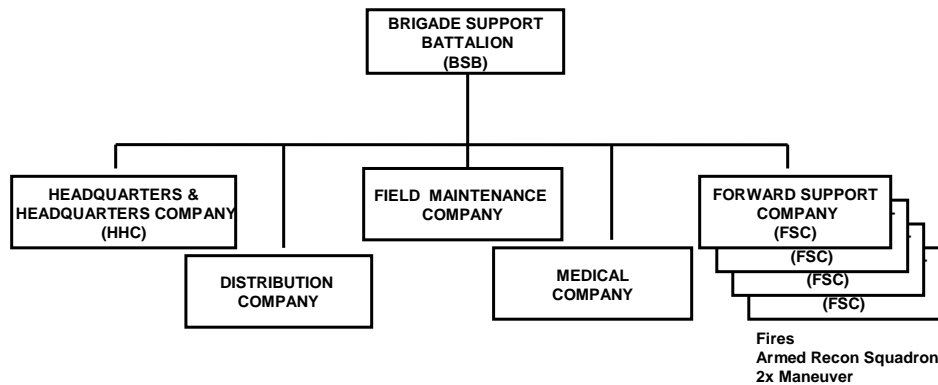


Figure 9 Brigade Support Battalion

It combines situational understanding (SU) with efficient delivery systems to form a distribution pipeline, reducing most stockpiles. Supplies are tailored and packaged for specific supported units based on a specific time and location. Total asset visibility, including in-transit visibility, gives logistics personnel visibility over all assets and infrastructure capacity in the area of operations (AO).

The multi-functional BSB plans, coordinates, synchronizes, and executes replenishment operations in support of BCT operations. It distributes supply classes I, II, III, IV, V, VIII, and IX; provides food service and health service support, as well as, field maintenance and limited recovery. It maintains visibility of the theater distribution system, synchronizing the flow of throughput into the BCT's AO.⁷⁵ The BSB may function in a highly dispersed manner, with some BSB elements close to the maneuver units and others near the brigade rear area or within the support area in a non-contiguous battlefield. The BSB commander is the brigade commander's senior logistician and serves as the senior logistics advisor for support to the maneuver brigade. His battle staff monitors and manages sustainment operations through on-site

⁷⁵ Modular Force Logistics Concept (Draft), Version 5, A-4

supervision, recurring reports and an array of digital information systems and other technological innovations. The BSB provides logistical support for the HBCT. Just like the Force XXI unit assignment design with the FSCs assigned/organic to the support battalion, the FSB commander commands and controls the forward support company (FSC) (i.e. the FSC is direct support (DS) to the combined arms, fires battalion and the reconnaissance squadron). For the combined arms, fires and reconnaissance units its supplies, distribution and maintenance functions have been consolidated into the FSC design carried over from Force XXI. Medical operations remain with the HHCs of the combined arms, fires and reconnaissance units. However, there still must be close involvement with synchronizing the maneuver of the BSB and the maneuver battalion's DS FSC with the inbound shipments from echelon above brigade (EAB). The BSB places a single smaller footprint on the battlefield through dispersion and centralization of sustainment due to this redesign and reliance upon distribution based sustainment operations.

The mission of the distribution company is to provide supply and transportation support to the brigade. Its capabilities are: daily receipt, temporarily storage and issuance of all classes of supply (less class VIII) to the BCT; class III(B) fuel support of up to 69,500 gallons per day using HEMMT tankers and the Lightweight Modular Fuel Farm. Deliver class III(B) to the FSC. Water purification; operate one water point and purify 30K gallons of potable water per day from fresh water and 24,000 per day when using salt or brackish water. Store and distribute 32K gallons to three FSCs simultaneously. At level one, with 100% vehicles available, this unit can provide one-lift capability of: 256 warehouse pallets or 64 air force pallets, 113 STONS of general cargo or 204 STONS of class V.⁷⁶

⁷⁶ U.S. Department of the Army, Modular Logistics Capabilities Book, Version 1.5272 (Fort Lee, VA.:CASCOC, 2005), 1-5

The field maintenance company's mission is to provide field level maintenance to BCT. It's capabilities are: Provide recovery, auto/armament, ground support, and electronic maintenance management to BCT and brigade base elements (HQ, BSB, BTB). Provide maintenance advise and support, serve as central entry and exit point for low density items for the BCT. Base support platoon performs consolidated maintenance on selected low density items, and area support platoon performs DS to base elements. Provides ULLS-G/SAMS-1 support to BTB and BSB.⁷⁷

Medical company provides brigade-level Combat Health Support (CHS) to organizations subordinate to the BCT, and to non-BCT organizations operating in the BCT area. This support includes the employment/coordination of corps level CHS assets attached to the BCT for operations. Some of its capabilities include C2, planning, policies, and support as well as coordination of patient movement including both allied and enemy prisoners of war (EPW) within and outside of BCT area. Patient holding capacity to include: nursing care for up to 20 patients. Optomertry service, laboratory and radiology services commensurate with the brigade level of supporting essential medical care and treatment to include: basic hematology, chemistry, parasitological, urinalysis testing, and plane/regional films with digital radiological processing capability.⁷⁸

Conclusion

The CSS operations in support of the modular force redesign is an organizational support bridge to the future. The reorganized division support structure provides a more seamless and efficient organization that meets the characteristics envisioned in today's doctrine and supports

⁷⁷ Ibid, 1-6

⁷⁸ Ibid, 1-7

initiatives to meet the goals for the future force. The proposed CSS support structure also appears to provide a more efficient structure from which to apply new and enhanced technologies. However, technology is not a panacea for personnel efficiencies. The effective application of technology to produce personnel efficiencies must be thoroughly tested and validated prior to implementation. The lessons learned from prior reorganizations should assist the development of the Modular Force. Modularity initiatives, not unlike the AOE and Force XXI studies, is attempting to meet the changing nature of war given force structure limitations and the obvious objective of creating the greatest capability for the least cost. During AOE in order to meet specific manpower objectives, many manpower requirements were ignored such as MARC; and a great reliance was placed on technology to leverage personnel requirements. The operational T-Rations and the Army Field Feeding Program is an example of technology leveraging that proved an incomplete success at best. Caution must be exercised prior to the elimination or realignment of personnel positions. The U.S. Army needs to concentrate more on the systems approach to combat power and include all combat support and combat service support as integral parts of the whole following the guidance of Task Force Modularity: The Role of Analysis in the Creation of the Modular Force. Perhaps a vision of CSS and CS as a "skeleton" to which "muscle" of combat arms is attached is superior to a "tooth" and "tail." approach that leads us to believe we can fight without a tail.

An analysis of current and possible future doctrine, today's technology enablers, and lessons learned from the last couple major reorganization of the army during the AOE and Force XXI studies offers several conclusions. First, which the reorganized force structure from a division based army to a brigade based army with the development of the forward support company appears to make good doctrinal and practical sense. Second, that information and improved material technology supports the reorganization but it is not the foundation of the concept. Technology will enhance support capabilities and should reduce manpower requirements once those technologies are fielded. Finally, manpower requirements are often overlooked or

omitted during the organizational development process to meet a specific endstate such as an increased "tooth-to-tail" ratio. However, manpower requirements must be validated and then implemented as a part of the system. The number of personnel assigned to provide support to a Force XXI division requires objective testing and validation under the myriad of situations to ensure manpower needs are met. Consolidation of functions does not eliminate the hard work of an individual providing effective combat service support.

The reorganized DISCOM to a Sustainment Brigade provides the BSB with a greater capability to meet the logistics requirements of the maneuver units, and thus really emphasizes forward support. The development of a FSC with a support operations section improves the CSS systems ability to anticipate, integrate, respond and ensure continuity to maneuver units. This synergy is achieved through the logistics specialization and capabilities of BSB, and its relationship between the maneuver unit and the BSB. The final personnel structure of the Sustainment Brigade, relationship of the BSB to the maneuver brigade and administrative procedures such as funding will require more attention as the redesign process moves forward.

Modular Force logistics is not fully understood. Units are concerned about the Division's ability to conduct materiel management within the new structure, and units are unsure who has oversight responsibility for logistics operations. As a concept, however, the CSS reorganization is a bold initiative. It indicates a real effort by the logistics community to meet the guidance of the military leadership and produce a well conceived of and conceptually viable innovative solution to provide improved and more efficient support to the future brigade.

The Way Ahead – The Future Combat System

Transformation occurs within a context of continuous change. The Army will provide for the accelerated fielding of select Future Force capabilities to enable the enhancement of the Current Force. The goal of Army Transformation is to provide relevant and ready Current Forces and Future Forces organized, trained, and equipped for joint, interagency, and multinational full

spectrum operations. Army transformation occurs within the larger context of continuous change brought about through the interaction of constantly evolving capabilities between Current and Future Forces

The Army has been transforming for three and a half years now with a broad mandate to change across many domains. The Future Combat Systems (FCS) is the material solution for the future force. FCS is the Army's modernization program consisting of a family of manned and unmanned systems, connected by a common network, which enables the modular force, providing our Soldiers and leaders with leading-edge technologies and capabilities allowing them to dominate in complex environments. It is a joint (across all the military services) networked (connected via advanced communications) system of systems (one large system made up of 18 individual systems, the network, and most importantly, the Soldier) connected via an advanced network architecture that will enable levels of joint connectivity, situational awareness and understanding, and synchronized operations heretofore unachievable. It will operate as a System of Systems (SoS) that will network existing systems, systems already under development, and systems to be developed to meet the requirements of the Army's Future Force Brigade Combat Team (BCT). Specific FCS capabilities will be spun out of the FCS program to provide enhanced capabilities for the entire modular force.⁷⁹

The Future Combat Systems includes 18+1+1 systems consisting of unattended ground sensors (UGS); two unattended munitions, the Non-Line of Sight – Launch System (NLOS-LS) and Intelligent Munitions System (IMS); four classes of unmanned aerial vehicles (UAVs) organic to platoon, company, battalion and Brigade Combat Team (BCT) echelons; three classes of unmanned ground vehicles, the Armed Robotic Vehicle (ARV), Small Unmanned Ground

⁷⁹ White Paper, Future Combat System (FSC), 18+1+1 Systems Overview version 19, September 2005

Vehicle (SUGV), and Multifunctional Utility/Logistics and Equipment Vehicle (MULE); and the eight manned ground vehicles (18 individual systems); plus the network (18+1); plus the Soldier (18+1+1).

The FCS-equipped Brigade Combat Team (BCT) will consist of three FCS-equipped Combined Arms Battalions (CABs), a Non-Line-of-Sight (NLOS) Cannon Battalion, a Reconnaissance Surveillance and Target Acquisition (RSTA) Squadron, a Forward Support Battalion (FSB), a Brigade Intelligence and Communications Company (BICC), and a Headquarters Company. The FCS-equipped Brigade Combat Team will be the Army's future tactical warfighting echelon; a dominant ground combat force that complements the dominant Joint team. Although optimized for offensive operations, the FCS-equipped Brigade Combat Team (BCT) will have the ability to execute a full spectrum of operations. FCS is suppose to improve the strategic deployability and operational maneuver capability of ground combat formations without sacrificing lethality or survivability.

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